ASER Report

Mr. Cooper provided an excerpt from chapter 7 of the 2018 ASER report (Oak Ridge Reservation Annual Site Environmental Report). ASERs document environmental surveillance and effluent monitoring, and are produced annually (https://doeic.science.energy.gov/ASER/). The excerpt provided evaluates potential radiological impacts to the public at various locations along the Clinch River and Tennessee River. The dose evaluation does not include locations on Bear Creek or Poplar Creek.

- The existing landfill (EMWMF) discharges into a tributary to Bear Creek. Of the multiple locations included in the report, only the "Lower Clinch River" is downstream of Bear Creek.
- Bear Creek is one of several creeks that drain into Poplar Creek. The Poplar Creek drainage basin is the largest in ORR, and receives drainage from 132 mi^2.

EMWMF Discharge to Surface Water

Contact Water at the EMWMF is routed into holding ponds and tanks. When the holding ponds are full, the Contact Water is released into a sediment basin where it flows over a V-weir and travels approximately 200 feet until it reaches North Tributary-5 (NT-5). NT-5 is an intermittent water course that flows approximately 1,000 feet into Bear Creek. From this point Bear Creek continues approximately 3.3 miles to the first public access point on Bear Creek (near Highway 95), although still on DOE property. From this point Bear Creek continues approximately two miles until it reaches the boundary of ORR.

Bear Creek continues beyond the ORR boundary, drains into Poplar Creek, which then drains to the Clinch River. The distance between the EMWMF outfall and the Clinch River is greater than 10 miles.

Dose Estimates in the 2018 ASER (chapter 7) – *provided by Mr. Cooper*

Surface water monitoring and dose estimates are evaluate four locations on the Clinch River. Three of the 4 locations are upgradient of confluence of Clinch River with Bear Creek, and are not relevant to discharges at EMWMF. Location CRK16 is downstream from all DOE ORR inputs, including downstream of the confluence with Poplar Creek (and Bear Creek). Quarterly monitoring of water for Hg, gross alpha, gross beta, gamma scan and tritium. CRK is 16 km is several miles (>10 miles) downstream from the EMWMF discharge point.

Fish tissue (sunfish and catfish) is sampled and dose estimated for three locations on the Clinch River, one of which is downstream of Bear Creek – CRK 16 – for Hg, PCBs, tritium, gross alpha, gross beta, gamma scan and strontium. CRK16 is over 10 miles downstream of portion of Bear Creek of interest. [Note, regular monitoring demonstrates the following radionuclides in the EMWMF contact water: Iodine-129, Strontium-90, Tc-99, Tritium, Uranium 233/234, Uranium 235/236, Uranium-238, Cesium-137 and Neptunium-237.]

- The report assumes fish consumption as follows:
    - Avid fish consumer: 27 kg/yr
    - Average person: 11 kg/yr (used for dose estimate)

- Doses are estimated for locations on the Clinch River and Tennessee River. Most locations are not downgradient of Bear Creek. One location on the Clinch River (CRK 16) is downgradient of the confluence of Bear Creek, 10+ miles from the EMDF discharge.
- The report does not evaluate doses to the public from Bear Creek.
- Analytical parameters do not include many radionuclides of interest related to the EMWMF.
- Data is not provided (summary tables only).

Related information in 2018 ASER

- NPDES program monitoring includes one surface water monitoring location in Bear Creek (station S24) directly downstream of the EMWMF discharge (BCK 9.2). Monitored 1/year, 7-day composite. Sum of derived concentration standard (DCS) = 7.4. This location is monitored for pH, nitrate, uranium. No fish tissue, no other analytes. Data is not provided.
- Fish are present in Bear Creek.
- The upper part of Bear Creek remediated in 2014. "The fish and aquatic invertebrate communities in the remediated section of Bear Creek were slightly impacted by drought in summer 2016, but the fish community appears to be recovering in 2017 and 2018 samples."

Annual Biological Program (BMAP) Report

Fish tissue is monitored at four locations in Bear Creek, including BCK 3.3, 4.6, 9.9, and 12.4 (upgradient). Fish population and fish tissue analysis is available as part of the biological monitoring program. The fish tissue is analyzed for PCBs and certain metals (including mercury); fish tissue is not analyzed for radionuclides. The ASER report does not provide additional data.

- Biological Monitoring in Bear Creek: fish are collected 2x/yr at 4 locations along Bear Creek (BCK 3.3, 4.6, 9.9, and 12.4
- Analyzed for metals and PCBs
- Not analyzed for radionuclides
- Fish are present
- PCBs and Hg are elevated

Presence of Fish

- Fish aren't present at the v-weir. Contaminants released into NT5 migrate via sediment, water and organism tissue to downstream sections of Bear Creek, including parts of Bear Creek designated for recreational use.
- Fish are present in the mid reaches of Bear Creek, as documented in the 2020 Remediation Effectiveness Report (RER), including rock bass in the mid reaches of Bear Creek, near BCK 9.9. Per the 2020 RER, six rock bass were collected from BCK 9.9 in both of the 2019 sample collection events (spring and fall); redbreast sunfish were also collected in both the lower and mid reaches of Bear Creek.